Center of Excellence for Coastal Ocean Observation and Analysis

Region: Northeast
Date Project Initiated: August 2002
(current number: NA16OC2740)

Brief Project Summary

The goal of the Center of Excellence for Coastal Ocean Observation and Analysis is to create a monitoring system for the coastal marine ecosystem of the western Gulf of Maine as part of the Integrated Ocean Observing System. Research conducted by the University of New Hampshire's (UNH) Coastal Ocean Observing Center is laying the foundation for an observing system with the capability to detect, model, and ultimately forecast changes in the ecosystem. Our research will lead to an understanding of the factors controlling the ecosystem and thus will play a role in decisions related to ecosystem-based management. The system is designed to serve the information needs of fisheries and coastal resource managers, educators, and scientists.

IOOS INTEGRATED OCEAN OBSERVING SYSTEM

This project is contributing to the Integrated Ocean Observing System (IOOS) by

- Acquiring and providing meteorological and biological data and products
- Engaging local resource managers and stakeholders in the design and implementation of data products
- Integrating observations with models to facilitate ecosystem-based management approaches

Key Accomplishments

Ecological/Environmental Time Series

- Beginning in 2000, the center has collected a time series of 8-day-averaged sea surface temperature and chlorophyll satellite observations for the Northeast using MODIS sensors. Since June 2004, a comprehensive suite of ecological and environmental data has been acquired at 16 stations on monthly cruises. The Great Bay buoy, utilizing new nutrient and optical sensors, has been deployed each summer since 2005. Hourly data are displayed in the context of historical trends.

Data Discovery and Access

- Data are served by WebCOAST, the center's data system. WebCOAST is a powerful relational database that houses 18 gigabytes of data locally, much of which is satellite-derived chlorophyll and sea surface temperature imagery generated by the remote sensing group. Cruise data and other data distributed across computers at UNH and at the Woods Hole Oceanographic Institute can be obtained through the WebCOAST data catalogue. The handling of distributed data sets in this way is a key component of interoperability needed for IOOS.

- The WebCOAST group built the Gulf of Maine Environmental Monitoring Program Locator, a Web-based tool and database for finding information regarding monitoring of water quality, air quality, contaminants, and biota within the Gulf of Maine region: *http://gomc.sr.unh.edu*. The project is a collaboration with the Gulf of Maine Council on the Marine Environment and the Gulf of Maine Ocean Data Partnership. The locator, which includes over 300 programs, was developed as a contribution to IOOS to provide data discovery and data accessibility for these important programs. The locator programs are being incorporated into the planned Gulf of Maine Monitoring Projects Portal to be hosted by NASA's Global Change Master Directory.

Education and Outreach

- Members of the education and outreach team authored a chapter for the *Earth Exploration Toolbook 4*, a National Science Foundation project connecting teachers with on-line sources of earth science data. The chapter, entitled "When is Dinner Served? Predicting the Spring Phytoplankton Bloom in the Gulf of Maine," provides step-by-step instructions for educators and students to investigate phytoplankton and their role

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in the earth system using data from both WebCOAST and the Gulf of Maine Ocean Observing System. The chapter was designated a "Teachers' Top Web Pick" for May 2005 on the Sea Grant Ocean Sciences Education Web site and was mentioned recently in the NetWatch section of *Science.*

Coastal Carbon Cycling

- The Coastal Carbon Project has organized and implemented a state-of-the-art laboratory for carbonate system analyses. The center is now one of the few labs in the country presently producing a large number of high-precision dissolved inorganic carbon measurements and continuous pCO2 analyses for coastal and estuarine waters. Data from these analyses demonstrate the importance of terrestrial influence, particularly large discharge events, on coastal carbon cycling. Significant progress has also been made toward the estimation of in-water pCO2 using a suite of optical and modeled circulation data provided by the Center.

Fisheries Applications: Modeling Cod Dispersal

- In partnership with the School of Marine Science and Technology at the University of Massachusetts, Dartmouth, members of the modeling and analysis group have completed the first phase of a study of the fate of dispersal of cod larvae from spawning areas located in the western Gulf of Maine. The study couples a physical circulation model with tracking of particles representing cod eggs and larvae. The location and timing of spawning areas were obtained from NOAA reports of survey data and from information exchanges with local area fishermen. The results show the importance of Massachusetts and Cape Cod bays as juvenile nursery areas for cod spawned as far away as mid-coast Maine. The study is intended to serve as a management tool for placement of protected areas and predictions of environmental influences on recruitment success of Gulf of Maine cod.

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Project Web site

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